

Three-dimensional volume rendering with multislice computed tomography in the evaluation of aortic coarctation

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The diagnosis of coarctation is initially suspected on physical examination and then confirmed by imaging¹⁻⁴. In infants, the main imaging modality is echocardiography. In children and adults, magnetic resonance and occasionally angiography provide additional important information and may modify the medical and surgical management¹⁻⁵. For instance, when minimal collaterals are present, the surgical approach may change from a primary repair to a bypass graft around the coarctation in order to protect the blood supply to the spinal canal⁵. Therefore the accuracy of the diagnostic modality influences the therapeutic decision.

Recently, a new generation of multislice computed tomography (MSCT) scanners have been introduced providing improved temporal and spatial resolution⁶.

A 19-year-old female, with a congenital isthmic coarctation of the thoracic aorta, underwent MSCT (Somatom Volume Zoom,

Siemens Medical Solutions, Forchheim, Germany) after intravenous administration of 100 ml of iodinated contrast medium.

The scan parameters were: detectors/collimation 4/1 mm, feed/rotation 6 mm (spiral pitch 1.5), rotation time 500 ms, scan time 22 s. Three-dimensional reconstructions with volume rendering algorithms were performed on a workstation equipped with a dedicated software (Vitrea 2, Vital Images, Minneapolis, MN, USA).

Relevant clinical information could be provided using the MSCT scan and three-dimensional reconstructions (Figs. 1 and 2). There were no associated anomalies of the aortic arch, no aberrant subclavian vessels, no atypical aortic stenoses and no patent ductus arteriosus. The typical isthmic configuration was displayed and the collateral circulation was evident. The intercostal, the internal mammary arteries and the left subclavian artery were hypertrophic, as would be expected in an adult with coarctation.

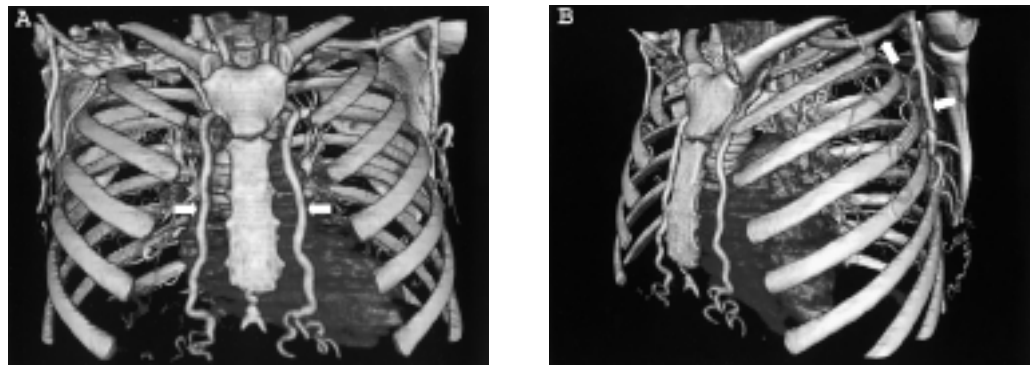


Figure 1. Volume rendering of multislice computed tomographic scan. The three-dimensional reconstruction shows the hyperplastic collateral circulation consequent to the coarctation. The internal mammary arteries (A, white arrows) as well as the left axillary trunk (B, white arrows) appear symmetrically enlarged.

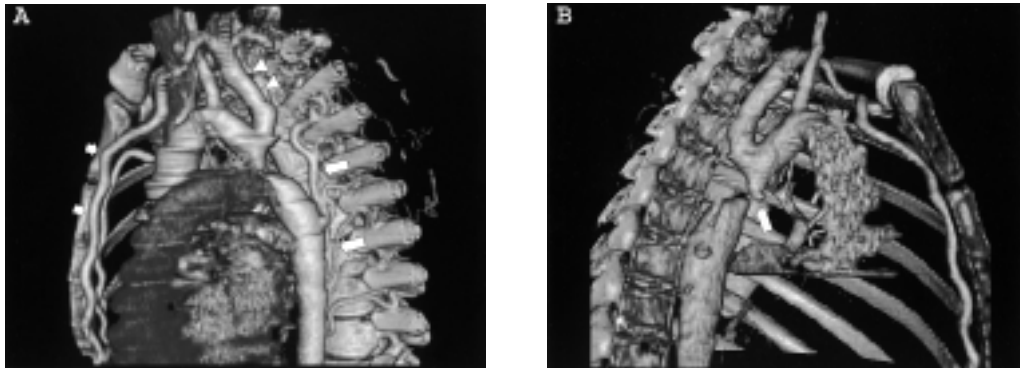


Figure 2. Multiplane views of the thoracic aorta. A: hyperplasia of the mammary arteries (white short arrows), of the left subclavian artery (white arrowheads) and of the left intercostal arteries (white long arrows). B: at the level of the isthmus, an almost total coarctation may be clearly seen (white arrow).

MSCT angiography is a suitable technique for the diagnosis and evaluation of aortic coarctation especially if completed with three-dimensional reconstructions¹.

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